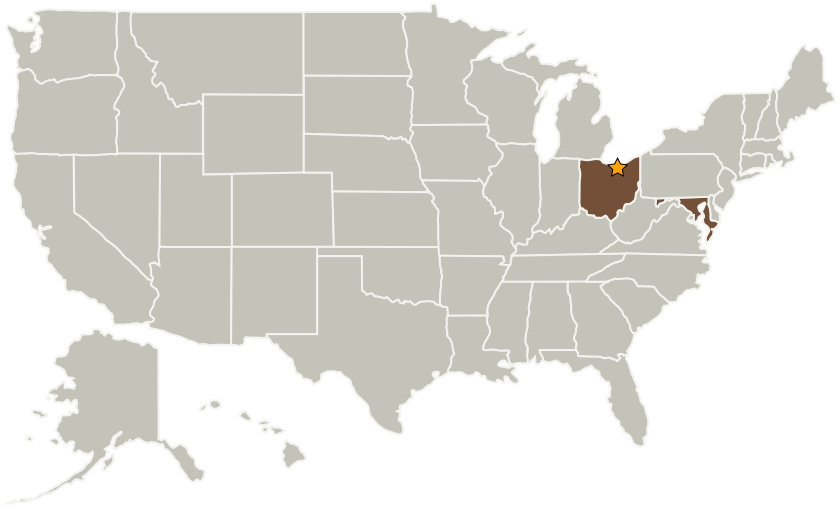
Efficient Wearable Antennas for Astronaut EVA Communications, Phase I

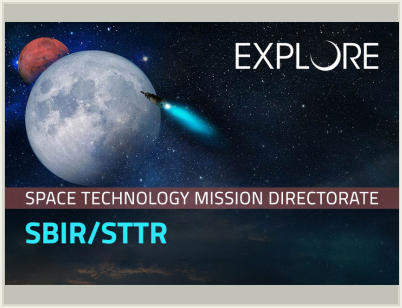
Completed Technology Project (2009 - 2009)

Project Introduction

In response to NASA SBIR Subtopic O1.02 (Antenna Technology), Pharad proposes to create a new class of highly efficient body wearable antennas suitable for astronaut Extravehicular Activity RF communications. The Phase I versions of the antennas will be developed on low loss, flexible material that can be readily incorporated on the surface of, or integrated within, an astronaut's Extravehicular Mobility Unit (EMU) spacesuit. We will leverage our extensive experience in developing electrically small, flexible, wearable, radiators to create unobtrusive antennas that are compatible with the UHF frequency band for NASA lunar or Mars exploration missions. The key innovations of our proposed research effort are the development of several new technologies: small radiator technology based on slow-wave engineering principles; efficient, small Electromagnetic Bandgap structures; and the integration of these technologies with diversity techniques to create an efficient body wearable antenna platform suitable for EMU integration. Our new technology will provide an unobtrusive, high performance body wearable radiating platform that will facilitate the next generation of astronaut RF communication systems. Throughout this effort rigorous, full-wave electromagnetic simulation tools will be used to predict the performance of the new concepts and the resulting antennas will be fabricated and tested in our measurement facilities.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Pharad, LLC	Supporting Organization	Industry	Glen Burnie, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves